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V. H. F. PRIMER

PART 7. CAVITY RESONATOR TABLES

By the Engineering Department, Aerovox Corporation

The accompanying table gives dimensions of cavity resonators of square prism, spherical, and cylindrical shapes for principal mode frequencies between 1000 and 30,000 megacycles. Cavity resonators often are specified in this frequency range. The Editors believe that the three simple shapes for which dimensions are given in the table will be the most commonly available to experimenters desiring pre-calculated data.

Dimensions in the table are inside dimensions and are in *inches*. Resonant frequencies are in megacycles per second. The 59 resonant frequencies given in column 1 have 500-Mc. separation which should be adequate in most cases. However, cavity resonator dimensions corresponding to frequencies not given in column 1 may be found by multiplying the 1000-Mc. dimension (for the desired cavity shape) by $1000/f_x$, where f_x is the desired resonant frequency in megacycles. For example: It is desired to know the inside diameter of a spherical cavity whose resonant frequency is 3235 megacycles. Multiply 8.35 (which is the diameter of a spherical cavity at 1000 Mc.) by 1000/3235. Thus, 8.35 (1000/3235) = 8.35 (0.3091) = 2.581 inches.

Similarly, the resonant frequency corresponding to a cavity dimension not given in the table may be found: Multiply 1000 by X/Y, where X is the dimension given for a cavity of the same shape at 1000 Mc. and Y is the dimension of the cavity in question. Thus: What will be the resonant frequency (f) of a cylindrical cavity of ¾" diameter? From the table, it is seen that a cylindrical cavity is 9.05 inches in diameter at 1000 megacycles. Therefore f = 1000 (9.05/0.75) = 1000(12.066) = 12,066 Mc.

The following convenient formulae are given for the benefit of the reader who desires to make direct calculations for purposes of his own:

SQUARE PRISM

(1) a (inches) $= 8347.2/f_{Mc}$

SPHERE

(2) b (inches) $= 10{,}360/f_{Mc}$

CYLINDER OF CIRCULAR CROSS SECTION

(3) c (inches) $= 9050.6/f_{Mc}$

When it is desired to convert the dimensions given in the accompanying tables into centimeters (as, for example, when comparing these dimensions with similar tables and data in other engineering papers and texts), multiply the listings in columns 2, 3, 4, or 5 by 2.54.

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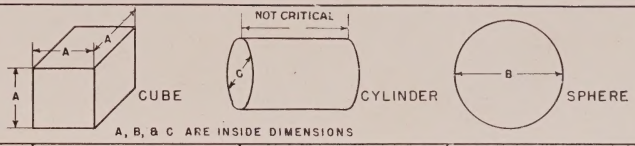
CAVITY RESONATOR DIMENSIONS

1000-30,000-Mc, RANGE

● For Fundamental Mode

FREQUENCY (Mc.)	WAVELENGTH (cm.)	DIMENSION A (inches)	DIMENSION B (inches)	DIMENSION C (inches)
1000	30.00	8.35	10.36	9.05
1500	20.00	5.56	6.90	6.03
2000	15.00	4.17	5.18	4.52
2500	12.00	3.34	4.14	3.62
3000	10.00	2.78	3.45	3.01
3500	8.57	2.38	2.95	2.58
4000	7.50	2.09	2.59	2.26
4500	6.66	1.85	2.29	2.01
5000	6.00	1.67	2.07	1.81
5500	5.45	1.51	1.87	1.64
6000	5.00	1.38	1.72	1.50
6500	4.62	1.28	1.59	1.39
7000	4.29	1.19	1.48	1.29
7500	4.00	1.11	1.38	1.20
8000	3.76	1.04	1.29	1.13
8500	3.53	0.985	1.22	1.07
9000	3.34	0.926	1.15	1.00
9500	3.16	0.876	1.09	0.950
10,000	3.00	0.835	1.04	0.905
10,500	2.86	0.795	0.987	0.862
11,000	2.73	0.760	0.941	0.822
11,500	2.61	0.725	0.900	0.788
12,000	2.50	0.696	0.863	0.755
12,500	2.40	0.668	0.828	0.724
13,000	2.31	0.642	0.798	0.696
13,500	2.23	0.619	0.768	0.671
14,000	2.14	0.596	0.740	0.647
14,500	2.07	0.577	0.714	0.625
15,000	2.00	0.558	0.690	0.602
15,500	1.94	0.539	0.669	0.583

CAVITY RESONATOR DIMENSIONS (Continued)



FREQUENCY (Mc.)	WAVELENGTH (cm.)	DIMENSION A (inches)	DIMENSION B (inches)	DIMENSION C (inches)
16,000	1.88	0.521	0.648	0.568
16,500	1.82	0.506	0.629	0.549
17,000	1.76	0.491	0.610	0.532
17,500	1.72	0.477	0.592	0.518
18,000	1.67	0.464	0.577	0.501
18,500	1.62	0.451	0.560	0.489
19,000	1.58	0.439	0.546	0.476
19,500	1.54	0.428	0.531	0.464
20,000	1.50	0.418	0.519	0.453
20,500	1.46	0.407	0.505	0.442
21,000	1.43	0.397	0.493	0.432
21,500	1.39	0.388	0.482	0.421
22,000	1.36	0.379	0.471	0.412
22,500	1.33	0.371	0.460	0.403
23,000	1.30	0.363	0.450	0.394
23,500	1.28	0.355	0.441	0.385
24,000	1.25	0.347	0.432	0.377
24,500	1.22	0.341	0.423	0.369
25,000	1.20	0.334	0.415	0.363
25,500	1.18	0.327	0.407	0.355
26,000	1.15	0.321	0.398	0.348
26,500	1.13	0.315	0.391	0.341
27,000	1.11	0.309	0.384	0.335
27,500	1.09	0.304	0.377	0.329
28,000	1.07	0.298	0.370	0.323
28,500	1.05	0.293	0.363	0.317
29,000	1.03	0.288	0.358	0.312
29,500	1.02	0.283	0.352	0.307
30,000	1.00	0.278	0.345	0.302

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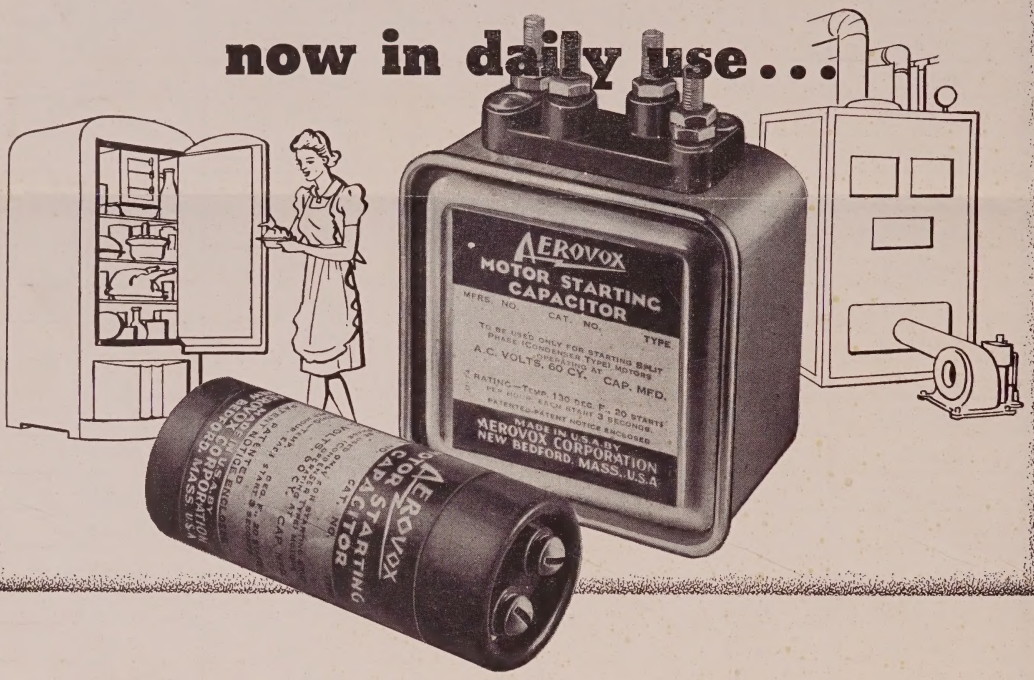

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